Operating System and Design (19CS2106S)
Lab- 5

Pre-Lab

Reading Directory Information: **opendir (), readdir (), and closedir ()**

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prelab

1. opendir()

It shall open a directory stream corresponding to the directory named by the dirname argument. The directory stream is positioned at the first entry. If the type DIR is implemented using filedescriptor, applications shall only be able to open up to a total of files and directories.

readdir()

It returns a pointer to a dirent structure representing next directory entry in the directory stream pointed to by dirp. It returns NULL on reaching the end of the directory stream or if an error occurred

closedir()

It shall close the directory stream referred to by the argument dirp. Upon return, the value of dirp may no longer point to an accessible object of the type DIR. If a fileDescriptor is used to implement type DIR, that fileDescriptor shall be closed.

chown: Changes a file's owner and/or group.

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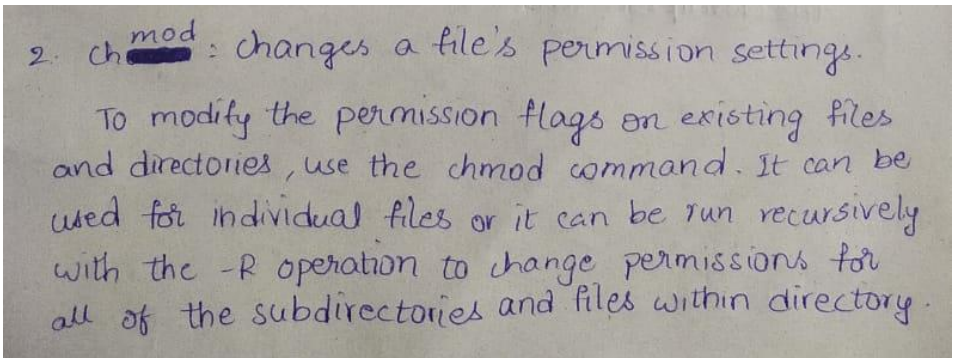
3. chown: changes a file's owner / or group

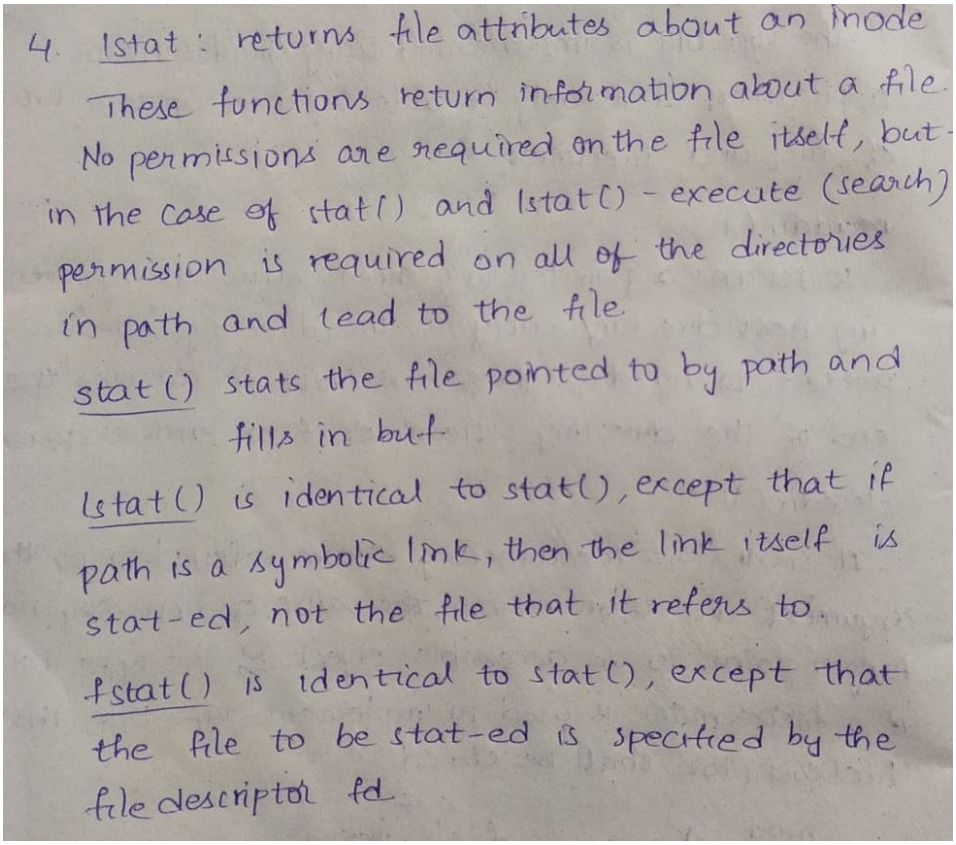
To change both the owner and the group of a file use the chown command followed by the new owner and group seperated by a colon with no intervening spaces and the target file.

chmod: Changes a file's permission settings.


2. chmod : changes a file's permission settings.

To modify the permission flags on existing files and directories, use the chmod command. It can be used for individual files or it can be run recursively with the -R operation to change permissions for all of the subdirectories and files within directory.

lstat: returns file attributes about an inode


4. lstat : returns file attributes about an inode

These functions return information about a file. No permissions are required on the file itself, but in the case of stat() and lstat() - execute (search) permission is required on all of the directories in path and lead to the file.

stat() stats the file pointed to by path and fills in buf

lstat() is identical to stat(), except that if path is a symbolic link, then the link itself is stat-ed, not the file that it refers to.

fstat() is identical to stat(), except that the file to be stat-ed is specified by the file descriptor fd

IN-LAB

1. attributes.c -- Uses lstat call and struct stat to display file attributes.

CODE

osd-190031187@team-osd:~

```
  GNU nano 2.3.1                                        File: attribute.c

#include <stdio.h>
#include <sys/stat.h>   /* For struct stat */
#include <stdarg.h>
#include <stdlib.h>
#include <time.h>
void quit(char *message, int exit_status)
{
        printf(" %s",message);
        exit(exit_status);
}

void arg_check (long int args, long int argc, char *message, long int exit_status)
{
        if (argc != args)
        {
                printf("%s", message);
                exit(exit_status);
        }
}

int main(long int argc, char **argv)
{
        struct stat statbuf;  /* We'll use lstat to populate this */
        arg_check(2, argc, "Single filename required\n", 1) ;
        if(lstat(argv[1], &statbuf) == -1)
                quit("Couldn't stat file", 1);
        printf("File: %s\n", argv[1]);
        printf("Inode number: %ld \n", statbuf.st_ino);
        printf("UID: %ld   ", statbuf.st_uid);
        printf("GID: %ld\n", statbuf.st_gid);
        printf("Type and Permissions: %o\n",statbuf.st_mode);
        printf("Number of links: %ld \n", statbuf.st_nlink);
        printf("Size in bytes: %ld\n", statbuf.st_size);
        printf("Blocks allocated: %ld\n", statbuf.st_blocks);
        printf("Last Modification Time: %s", ctime(&statbuf.st_mtime));
        printf("Last Access Time: %s\n", ctime(&statbuf.st_atime));
        exit(0);
}
```

OUTPUT

osd-190031187@team-osd:~

```
[osd-190031187@team-osd ~]$ nano attribute.c
[osd-190031187@team-osd ~]$ gcc attribute.c
[osd-190031187@team-osd ~]$ cat>f1.txt
THis is practical 5
my id is 190031187
[osd-190031187@team-osd ~]$ ./a.out f1.txt
File: f1.txt
Inode number: 1109966712
UID: 1779   GID: 1780
Type and Permissions: 100664
Number of links: 1
Size in bytes: 63
Blocks allocated: 8
Last Modification Time: Wed Sep  9 10:42:55 2020
Last Access Time: Wed Sep  9 10:42:20 2020

[osd-190031187@team-osd ~]$ ln f1.txt f2.txt
[osd-190031187@team-osd ~]$ ./a.out f1.txt
File: f1.txt
Inode number: 1109966712
UID: 1779   GID: 1780
Type and Permissions: 100664
Number of links: 2
Size in bytes: 63
Blocks allocated: 8
Last Modification Time: Wed Sep  9 10:42:55 2020
Last Access Time: Wed Sep  9 10:42:20 2020

[osd-190031187@team-osd ~]$ ./a.out f2.txt
File: f2.txt
Inode number: 1109966712
UID: 1779   GID: 1780
Type and Permissions: 100664
Number of links: 2
Size in bytes: 63
Blocks allocated: 8
Last Modification Time: Wed Sep  9 10:42:55 2020
Last Access Time: Wed Sep  9 10:42:20 2020

[osd-190031187@team-osd ~]$
```

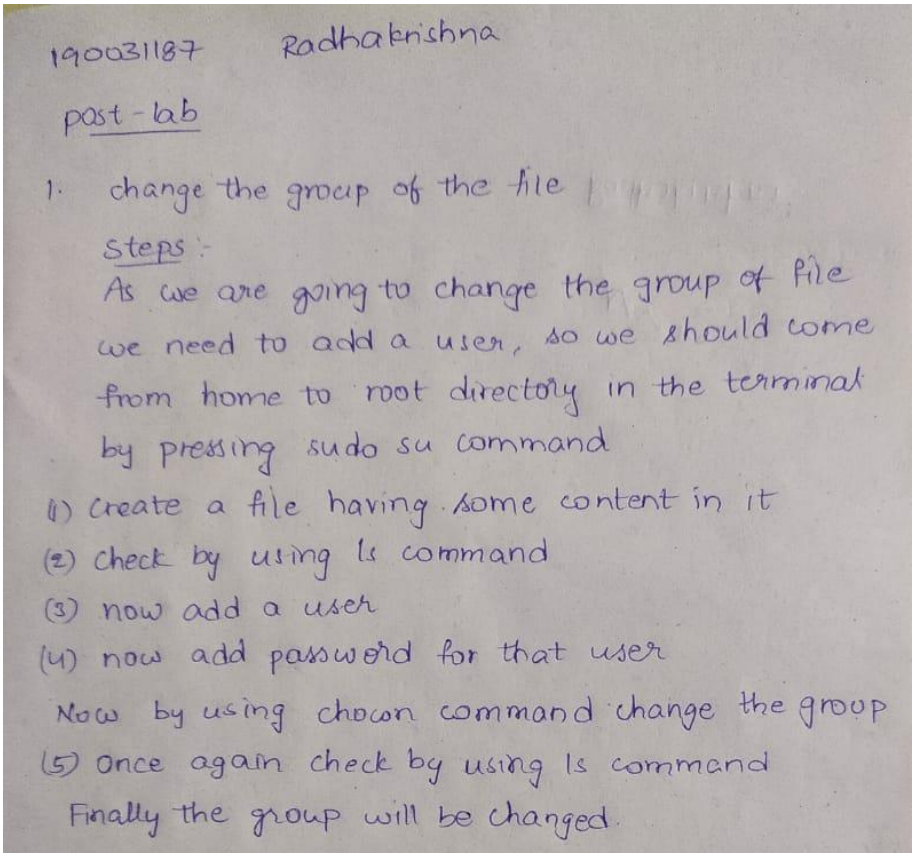
2. lsdir.c -- Lists only directories - Uses S_IFMT and S_ISDIR macros

CODE

OUTPUT

Post-Lab

1. mychown.c -- change the group of the file.



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post-lab

1. change the group of the file

Steps :-

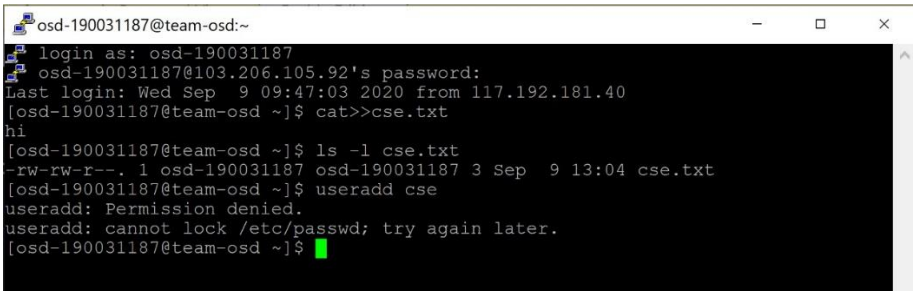
As we are going to change the group of file we need to add a user, so we should come from home to root directory in the terminal by pressing sudo su command

(1) Create a file having some content in it
(2) Check by using ls command
(3) now add a user
(4) now add password for that user

Now by using chown command change the group

(5) Once again check by using ls command

Finally the group will be changed.



```
osd-190031187@team-osd:~
login as: osd-190031187
osd-190031187@103.206.105.92's password:
Last login: Wed Sep  9 09:47:03 2020 from 117.192.181.40
[osd-190031187@team-osd ~]$ cat>>cse.txt
hi
[osd-190031187@team-osd ~]$ ls -l cse.txt
-rw-rw-r--. 1 osd-190031187 osd-190031187 3 Sep  9 13:04 cse.txt
[osd-190031187@team-osd ~]$ useradd cse
useradd: Permission denied.
useradd: cannot lock /etc/passwd; try again later.
[osd-190031187@team-osd ~]$
```

The reason why it is not working here. I don't have the permission to add a new user

2. mychmod.c -- changed the permission flags of the file.